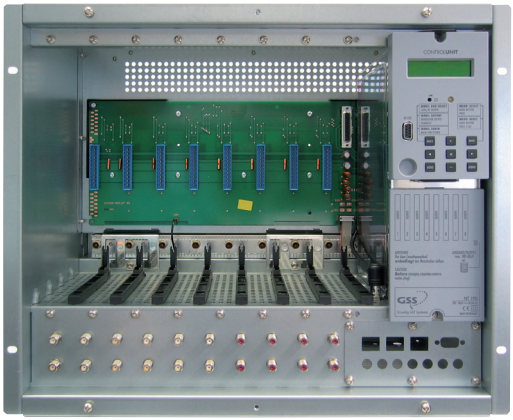
Assembly Instructions

English

Grundig SAT Systems

Head-End Station

STC 816



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1 Notes about safety and hazards

- Observe the relevant VDE regulations.
- **If the power cord needs to be replaced, only use an OEM power cord.**
- **Only replace fuses with fuses of the same type, and which also have the same cut-off characteristics.**
- The standards IEC/EN/DIN EN 50083 and IEC/EN/DIN EN 60728 must be observed, especially concerning equipotential bonding and earthing.
- Observe the relevant standards, regulations and guidelines on the installation and operation of antenna systems.
- Before starting installation or service work disconnect the receiving system from mains.
- Do not perform installation and service work during thunderstorms.
- Assembly, installation and servicing must be carried out by an authorised electrician.
- For a complete disconnection from the mains, the mains plug must be pulled out of the mains socket. Ensure that the mains plug can be pulled out without difficulties.
- Install the head-end station
  - in a dry, dust-free environment
  - in such a manner that it is protected from moisture, fumes, splashing water and dampness
  - where it is protected from direct exposure to sunlight
  - on a vibration-free wall or floor construction
  - not within the immediate vicinity of heat sources
- The head-end station should only be installed in a room where the permissible ambient temperature range (0 °C and +50 °C) can be maintained, even during fluctuations in climatic conditions. In case of the formation of condensation wait until the system is completely dried.
- Ensure that the head-end station is adequately ventilated.
- Do not cover the ventilation openings!
- Make sure there is a minimum space
  - at wall mounting 40 cm above and below
  - at mounting in a 19" cabinet 20 cm above and below, as well as 10 cm behind.
- To avoid too strong heating of the head-end stations it is not admissible to mount them one upon the other without using thermic precautions (e.g. permanently air recirculation, heat deflectors etc.).
- Do not install the head end in cabinets or recesses which are not ventilated.

- If additional fans are to be used to circulate the air, ensure that the system will be shut down (disconnected from mains) should any one of the fans fail.
- Do not place any vessels containing liquids on the head-end station.
- Do not place anything on the head-end station which could initiate fires (e.g. candles).
- Due to the risk of fires caused by lightning strikes, we recommend that all mechanical parts (e.g. distributor, equipotential bonding rail, etc.) be mounted on a non-combustible base. Wood panelling, wooden beams, plastic covered panels and plastic panels are all examples of combustible bases.
- Avoid short circuits!
- To ensure electromagnetic compatibility, make sure all connections are tight and that the covers are screwed on securely.
- No liability is accepted for damage caused by faulty connections or inappropriate handling of the device.
- You can obtain additional information from the "Planning handbook" brochure which can be found on the website "***http://www.gss.de***" under the "***Service***" category.

Electronic devices should never be disposed of in the household rubbish. In accordance with directive 2002/96/EC of the European Parliament and the European Council from January 27, 2003 which addresses old electronic and electrical devices, such devices must be disposed of at a designated collection facility. At the end of its service life, please take your device to one of these public collection facilities for proper disposal.

2 General information

2.1 Meaning of the symbols used

Important note

• Performing works

Danger by electrical shock

—> General note

2.2 Scope of delivery

1 STC 816 head-end station (without cassettes)
1 CD (assembly instructions)
1 Brief assembly instructions
1 Ferrite sleeve
1 Power cord + strain relief

2.3 Available accessories

For cassettes and accessories see website "***www.gss.de***".

2.4 Technical data

The devices meet the following EU directives:
2006/95/EC, 2004/108/EC
The product fulfils the guidelines and standards for CE labelling.

Unless otherwise noted all values are specified as "typical".

General

Cassette slots: 8
Admissible ambient temperature: ..... 0 °C … +50 °C
Dimensions (W x H x D) [mm]: ..... 483 x 397 (9 HU) x 302
Weight (fully equipped): ..... approx. 20 kg
LNB operating voltage: ..... +18 V / ≤1 A total (short-circuit-proof)
Other operating voltage: ..... +12 V / ≤1 A total (not short-circuit-proof, use with appropriate external fuse only)
RS 232 socket: … data interface for software update and remote maintenance
SAT IF input distributor: 2

Data of <u>one</u> SAT IF input distributor

Frequency range: ..... 950 … 2150 MHz
SAT IF inputs: ..... 2 F sockets
SAT IF loop-through output: ..... 1 F socket
SAT IF outputs: ..... 6 + 4 F sockets
Input / output impedance: ..... 75 Ω
Decoupling of the outputs: ..... 20 dB
Tap-loss 1-6 (see page 8): ..... 9 … 14 dB
Through-loss: ..... 8 dB
Tap-loss 1-4 (see page 8): ..... 9 … 12 dB
LNB operating voltage: ..... +18 V / max. 1 A total (1 A at one LNB connector, 0.5 A at two LNB connectors 0.25 A at four LNB connectors etc.)

HF output collector

Frequency range: ..... 45 … 860 MHz
Control range of each input: ..... 0 … –25 dB (electronically)
Control range of each output: ..... 0 … –6 dB (electronically)
Input, output impedance: ..... 75 Ω
Return loss: ..... 14 dB
HF output: ..... IEC connector

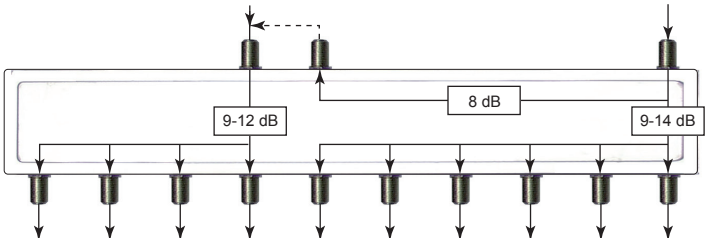
Decoupling loss of the inputs: ..... 30 dB
Gain: ..... 13 dB
Output level with 16 channels ..... maximum

Power supply NT 190
Mains voltage: ..... 220–240V~, 50/60 Hz
Power consumption (fully equipped, incl. LNB power supply): ..... 150 W

2.5 Description

The head-end station has a modular structure and can hold up to 8 Standard cassettes. You can find a list of the current Standard cassettes at the website "***www.gss.de***". This head-end station is designed exclusively for use with cassettes of the Standard marketing programme. The various expansion options for the head-end station allow for the installation of a wide range of broadband cable systems.
Two integrated SAT IF input distributors has in total four SAT IF inputs. You can use them to distribute the reception levels each over 4 or 6 outputs. Using the loop-through output enables you to distribute reception level 1 over the 10 outputs for each SAT IF input distributor. The F sockets of both reception levels are coloured.

Basic signal pattern:



Unused loop-through outputs must be terminated with the resistors supplied.
The power supply in the head-end station is designed to supply power to components (e.g. LNBs) connected upstream. These are supplied via the SAT IF input distributors' input sockets with operating voltage (+18 V) at a total current of max. 1 A.
The head-end station's power supply unit can be used to supply peripheral devices with voltage (+12 V / max. 1 A, with an external fuse).
The cassettes' HF output signals are accumulated in a programmable HF output collector and then directed to the HF output and to the test output via the downstream hybrid amplifier.

When the head-end station is shipped from the factory, the default setting for the HF output level of the output collector is -3 dB. You can use the software of the control unit to program the master output level of the head-end station.
The software version of the control unit appears on the two-line LC display after switching on the head-end station.
If the inner temperature of the head-end station exceeds the permissible temperature of 65 °C when operating, a message appears in the display instead of the standby menu. This message contains the maximum measured temperature and the number of the head-end station.
The display also supports dialogue guidance when programming the head-end station. Use the buttons of the control unit to program the head-end station. You can also use the PSW 1000 software and the HRCU 8 / RCU 1 management unit to program the head-end station.
The RS 232 interface of the control unit enables you to use a PC or a notebook and the "**BE-Flash**" software to update the operating software of the control unit. You can find the current operating software for the control unit, the software "**BE-Flash**" and the current assembly instructions on the website "***www.gss.de***".

3 Overview

3.1 Front cover

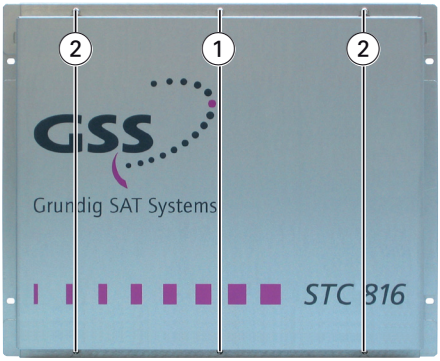


Fig. 1

① Locking screws ② Mounting screws

—> To maintain compliance with the EMC regulations, the head-end station must not be operated without this front cover.

3.2 Connectors and components

Front view / side view (type label)

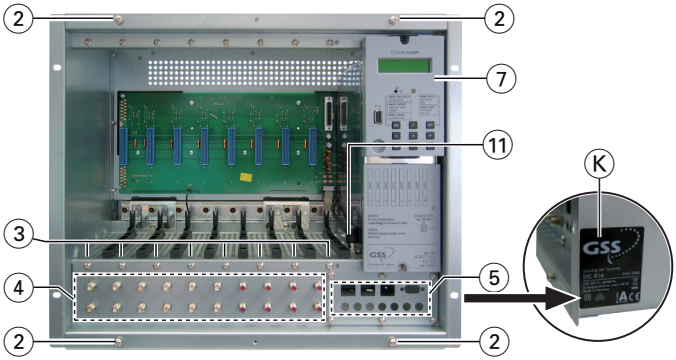


Fig. 2

(2) Mounting screws
(3) Cassette slots 1 … 8
(4) Outputs of the SAT IF input distributors
(5) Cover with openings for cable terminals

—> **To maintain compliance with the EMC regulations, must not be operated without this cover.**
—> The rectangular openings are affected to to mount RJ45 cable terminals.

(7) Control unit
(K) Type label

View from below

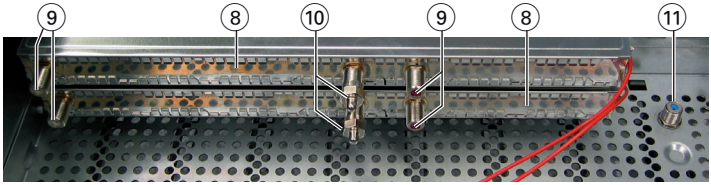


Fig. 3

(8) SAT IF input distributors
(9) Inputs of the SAT IF input distributors
(10) SAT IF loop-through outputs
(11) HF output of the head-end station

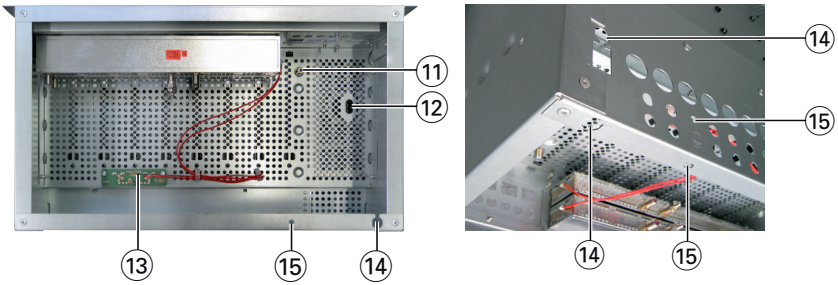


Fig. 4

(12) Mains connector
(13) Distributor for LNB operating voltage
(14) Openings for the strain relief of the mains connection cable
(15) Openings for the potential equalisation screw

Rear view

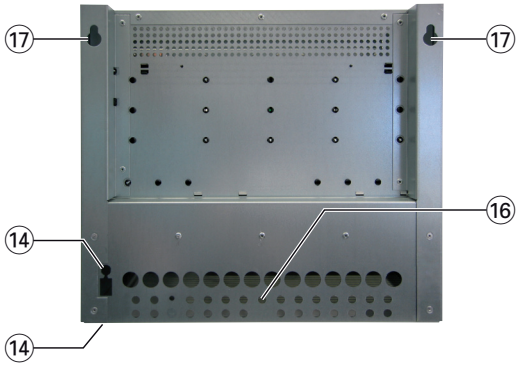


Fig. 5

⑭ Openings for the strain relief of the mains connection cable
⑯ Opening for the securing screw
⑰ Openings for mounting screws (wall mounting)

3.3 Control unit

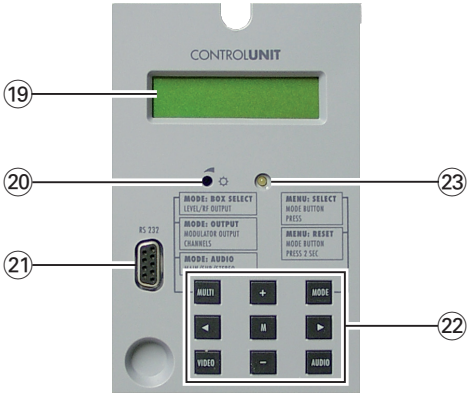


Fig.6

⑲ LC display
⑳ Control to set the contrast of the LC display.
㉑ 9-pin D-SUB socket to update the operating software, to connect the HRCU 8 / RCU 1 management unit.
㉒ Control buttons (control panel)
㉓ Operation display

4 Installing the head-end station

4.1 **EMC regulations** (**e**lectro**m**agnetic **c**ompatibility)

To comply with the current EMC regulations, it is necessary to connect the lines leading in and out of the head-end station (e.g. Cinch, HF) using standard cable terminals.

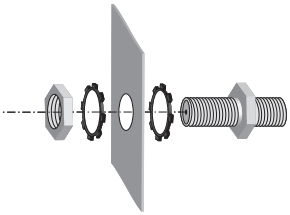


Fig. 8

- According to figure 8 insert the required number of standard cable terminals in the openings provided in the front of the head-end station (fig. 2 ⑤, page 10).

Tighten the nuts on the cable terminals until the teeth on the lock washers have penetrated the exterior coating and a good connection is made between the housing and the cable terminals.

—> To maintain compliance with the EMC regulations, the head-end station must not be operated without this front cover.

4.2 Remove front cover

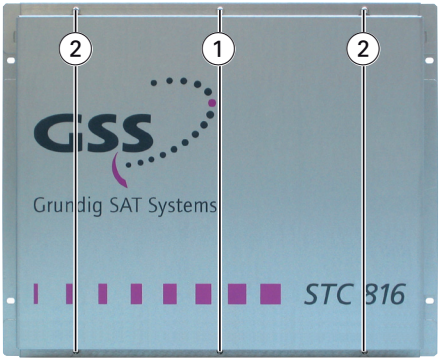


Fig. 7

- Unscrew the locking screws (1).
- Loosen the mounting screws (2).
- Slide the front cover upwards and unhook it.

4.3 Mounting the head-end station

– Install the head-end station vibration-free.
Avoid, for example, mounting the head-end station onto a lift shaft or any other wall or floor construction that vibrates in a similar way.

– **To avoid too strong heating of the head-end stations it is not admissible to mount them one upon the other without using thermic precautions (e.g. permanently air recirculation, heat deflectors etc.).**

– Ensure that
  - the mounting area can support the weight of the head-end station
  - there is an adequate ventilation
  - the permissible ambient temperature will be maintained
  - the mounting position is dry and protected against splashing water.

—> For a complete disconnection from the mains, the mains plug must be pulled out of the mains socket. Ensure that the mains plug can be pulled out without difficulties.

Wall mounting

—> Use mounting material suitable for the **wall properties**.
—> Position the head-end station so that the distance of free space below and above is **minimum 40 cm**.
—> The distance of the upper holes is 413 mm.

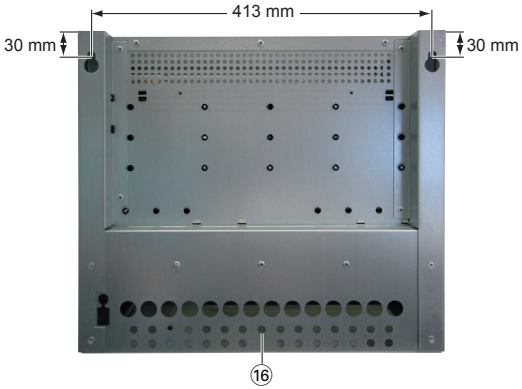


Fig. 9

- Screw in the upper mounting screws at the position whished, mount the head-end station and mark the position for the locking screw (16).
- Remove the head-end station and attach the hole for the locking screw.
- Mount the head-end station and fix it with the locking screw (16).

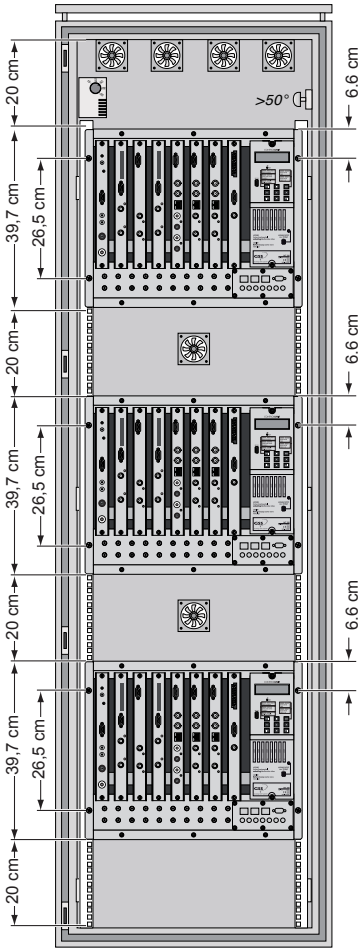
Mounting in a 19" cabinet

The head-end station has been designed for installation into 19“ rack systems.

—> The total installation height of a 19“ unit is 9 HU (39.7 cm, hole spacing 26.5 cm).

⚠ In cabinets a circular aeration (e.g. by means of ventilators) is to be ensured. If the ambient temperature inside the cabinet exceeds +50 °C, a thermo switch with reclose inhibition must automatically disconnect the system from the mains power supply.

- Position the head-end station in the cabinet so that there is a minimum free space of 20 cm above and below, as well as 10 cm behind.



5 Installing a cassette

Before installing or changing a cassette unplug the power cable of the head-end station from the mains power socket.

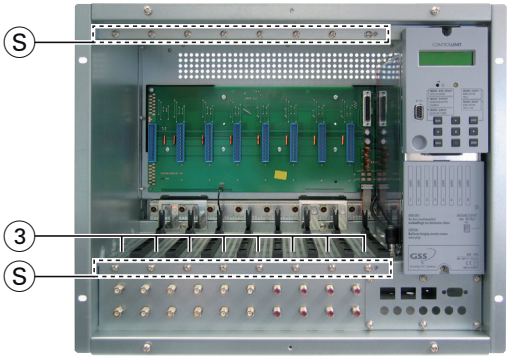


Fig. 10

- Remove the fastening screws (S) of an unoccupied slot (3) from the bracket of the head-end station.
- Insert the cassette in this slot and push it into the housing.
- Align the cassette according to the connections in the board and the HF collector and press it firmly into place in the head-end station.
- Fasten the cassette with the screws (S).

6 Power supply

6.1 SAT IF input distributor

See figures 11 and 12 for the power supply for the SAT IF input distributors. The power distributor (fig. 12) is supplied with power (+ 18 V / max. 1 A ⎓) via the Ⓥ connection (fig. 11). The Ⓨ connections of the power distributor (fig. 12) are for providing power for the LNBs connected via the SAT IF input distributors.

The total output current for all LNBs connected must not exceed 1 A.

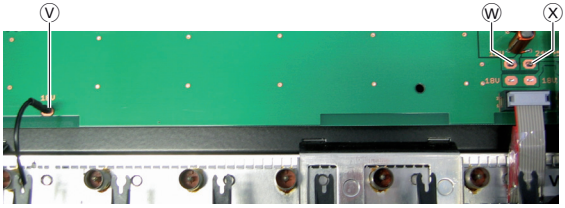


Fig. 11

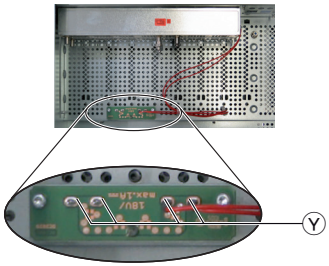


Fig. 12

6.2 Connecting peripheral devices

Via connector Ⓦ (fig. 11) peripheral devices can supplied with power (+12 V / max. 1 A ⎓).

Connect peripheral devices via external fuses only!

6.3 Power supply unit (PSU)

The PSU of the head-end station is especially magnetically shielded. When exchanging or replacing the PSU, please make sure that it is always installed into the head-end station with the shielded cover fitted (power supply, type NT 190).

Before removing the PSU, pull off the mains cable from the PSU!

7 Connecting the head-end station

7.1 Potential equalisation (PE)

Equalise the potential (PE) in accordance with IEC/EN/DIN EN 50083 and IEC/EN/DIN EN 60728.

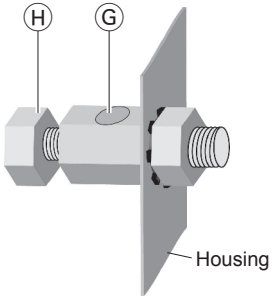


Fig. 13

- Put the PE wire (Cu 4 - 20 mm²) into the hole (G) (fig. 13) of the PE connection terminal (15) (fig. 4) and fasten the PE wire with the screw (H) securely.
- Connect the PE connection terminal to a PE rail (supplied by customer) using the PE wire.

7.2 Connecting the SAT IF input distributor

Overview

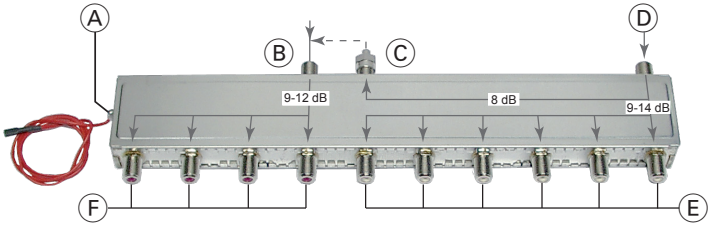


Fig. 14

(A) LNB power connection
(B) Input 2
(C) Loop-through output of input 1 (D) with terminating resistor
(D) Input 1
(E) Outputs of input 1 (D)
(F) Outputs of input 2 (B)

Connecting SAT IF inputs

The following description refers to one of the SAT IF input distributors. The other SAT IF input distributors are connected in the same manner.

- Connect outputs Ⓔ and Ⓕ of the input distributor (fig. 14) on the front of the head-end station (fig. 2 ④) to the corresponding inputs on the cassettes.

Using two reception levels (factory settings)

- Connect inputs Ⓑ and Ⓓ of the SAT IF input distributor (fig. 14) to the LNBs.
- Terminate loop-through output Ⓒ (fig. 14) using the terminating resistor supplied.

Using one reception level (loop-through operation)

- Connect input Ⓓ of the SAT IF input distributor (fig. 14) to the LNB.
- Connect loop-through output Ⓒ to input Ⓑ using a HF cable made on-site.

7.3 Connecting HF output of the head-end station

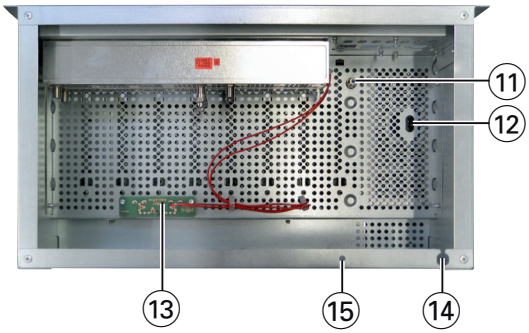


Fig. 15

- Connect the HF output of the hybrid amplifier ⑪ to the cable system.

7.4 Mains connection

- Mount the power cord + strain relief (Fig. 16a) optionally at the rear/bottom side ⑭ (Abb. 16b). Connect the power cord to the PSU ⑫ (Abb. 15) .

Fig. 16a

Use only the power cord supplied. It is part of the approval and must only be replaced by an original spare part.
To maintain compliance with current EMC regulations, it is necessary to route the power cord through the supplied ferrite sleeve ㉔.
Mount the ferrite sleeve as near as possible to the housing of the head-end station (fig. 16b).

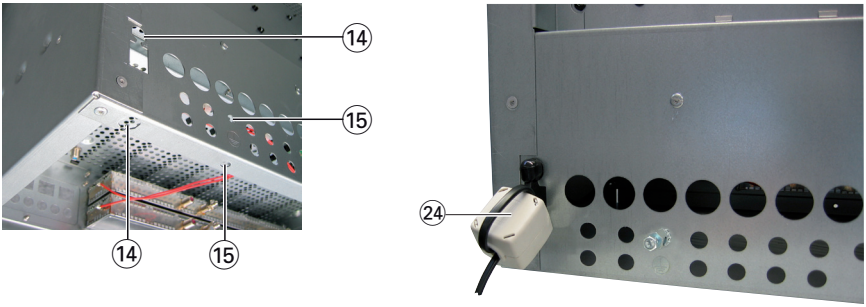


Fig. 16b

- Open the ferrite sleeve.
- Make a loop in the power cord and lay the loop inside the ferrite sleeve as shown in fig. 17.
- Close the ferrite sleeve (fig. 18).

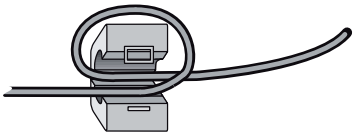


Fig. 17

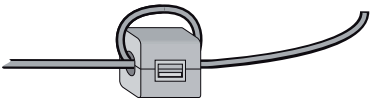


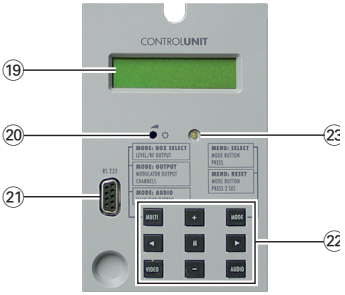
Fig. 18

- Connect the power cord of the head-end station to the mains socket.

The head-end station is only completely separated from the mains voltage by pulling the power supply plug.

8 Setting the contrast of the display

- Adjust the contrast of the display using the controller (20).

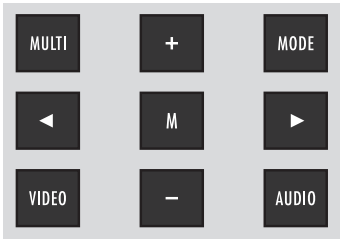


9 The control panel at a glance

9.1 Control panel

Program the head-end station using the buttons (control panel) on the control unit.

MODE scrolls forward through the menus.
◄/**►** select parameters in the menus.
+/**-** set values, initiate actions.
MULTI selects sub-menus.
AUDIO scrolls backward through the menus.
M saves all entries.



9.2 Menu items

The key pad on the head-end station is used to scroll through the menus.
The two-line display of the control unit then shows the menus.
The parameters and functions to be set are underlined.
Use the **MODE** key to select the following main menu items:

- System information
- Output level of the cassettes
- Output level of the head-end station
- Number of the head-end station
- Modem
- Password

10 Updating the software of the control unit

10.1 Updating software via PC

The RS 232 interface of the control unit enables you to use a PC or a notebook and the "**BE-Flash**" software to update the operating software of the control unit.
You can find the "**BE-Flash**" software and the current operating software of the head-end station's control unit at the website "***www.gss.de***".

- Use a "one-to-one cable" (see fig. 19 for circuit) to connect the control unit's RS 232 interface and the PC.

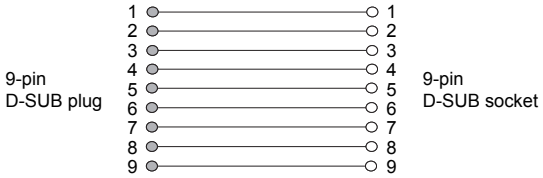


Fig. 19

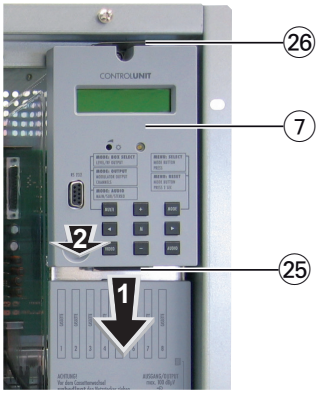
- Start the "**BE-Flash**" software and update the software of the control unit.

10.2 Updating the software via second control unit

In this type of update, the current version of the software in one control unit (master) is transferred to the control unit you want to update (slave).

Removing master control unit

- Switch off the head-end station.
- Disconnect snap-in hook (25) in the direction of arrow " **1** ".
- Pull control unit (7) in the direction of arrow " **2** " on the bottom and disconnect from snap-in hook (26).



Programming slave control unit

- Switch off the head-end station of the slave control unit.
- Connect the 15-pin D-SUB plug on the back of the master control unit to the RS 232 interface of the head-end station's slave control unit via a connection cable made on-site as follows.

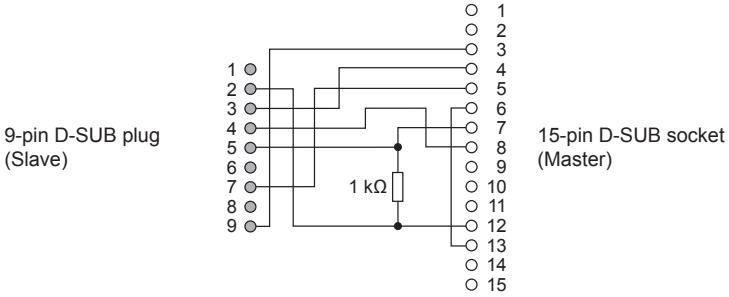


Fig. 21

- Switch on the head-end station.
- Wait for the "**Update Mode**" message of the master control unit and press button **M** on this unit.

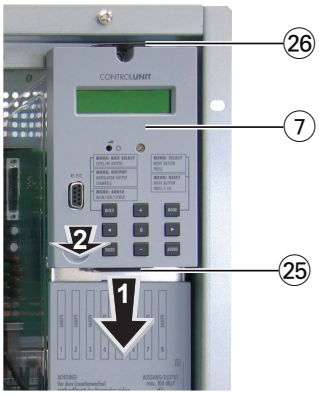
—> The software of the slave control unit is replaced by the master control unit's software.

- After the message "**Update Mode OK**" appears, switch off the head-end station.
- Remove the connection cable between the slave and master control units.
- Switch on the head-end station.

—> The head-end station's slave control unit registers with the current version of the software.

Inserting master control unit

- Connect control unit (7) to the snap-in hook (26).
- Push the control unit towards the head-end station, in the direction opposite that of arrow " **2** " on the bottom, and connect it to the 15-pin D-SUB socket of the head-end station.
- Connect snap-in hook (25) in the direction opposite that of arrow " **1** ".



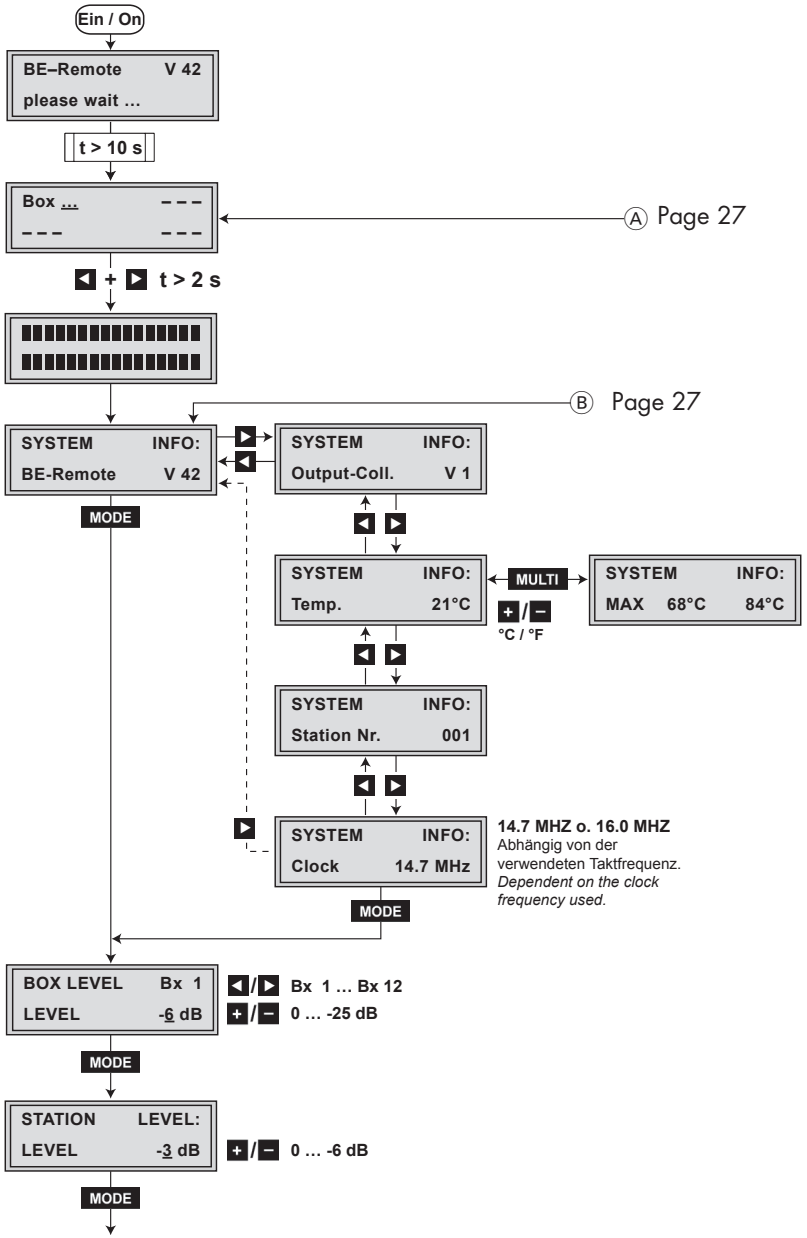
11 Programming

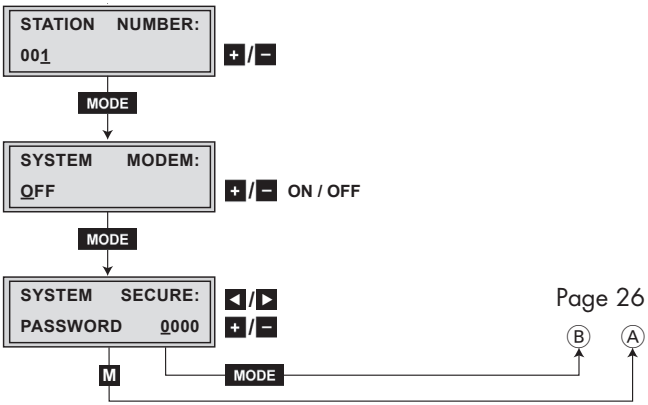
11.1 Preparation

- Connect the test receiver to the test output of the head-end station.
- Set the HF output data of the cassettes used.

—> In the following software version 42 is described. The latest version of this assembling instructions can be found in the internet at "www.gss.de"

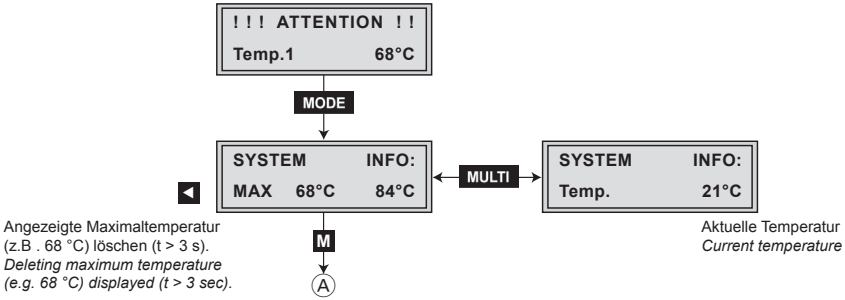
11.2 Programming procedure





Message after temperature exceeding

Instead of the standby "**BE-Remote**" menu the "**ATTENTION**" menu is displayed.



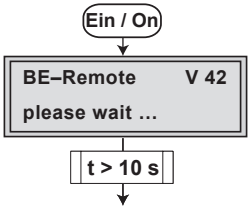
Page 26

11.3 Programming the head-end station

—> Pressing the **MODE** button for longer than 2 seconds cancels the programming procedure. This takes you back to the program item "Activating system information" from any menu. Any entries that have not been saved are reset to the previous settings.

—> Entries in the menus can be saved by pressing the **M** key. You are taken back to the "Activating system information" menu item.

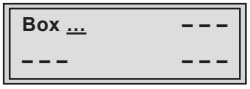
- Switch on the head-end station.



—> The display shows the software version of the head-end station (e.g. "**V 42**").

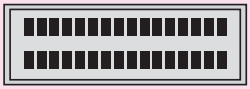
—> The processor reads the cassettes' data (approx. 10 seconds).

Activating system information



- Activate the "System information" software by simultaneously holding down the buttons ◄ and ► for more than 2 seconds in the "Selecting the cassette" mode.

—> The display darkens.

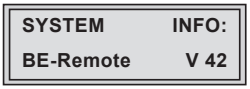


Afterwards the "System information – control unit" – "**SYSTEM INFO: BE_Remote**" menu appears.

—> The "System information" software also can be called up from the stand-by mode of the display.

System information – control unit

This menu shows the software version of the control unit (e.g. "**V 42**").



To perform settings:

- Press the **MODE** button.

—> The "Setting the HF output level of the cassettes – "**BOX LEVEL**" is activated.
Continue on page 31.

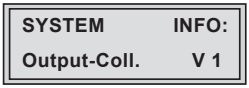
To call up information about the head-end station:

- Press the ► button (following information menus) or the ◄ button (previous information menus).

—> The "System information – output collector" – "**SYSTEM INFO: Output Coll.**" submenu is activated.

System information – output collector

This menu shows the software version of the output collector (e.g. "**V 1**").



- Press the ▶ button.

—> The "System information – temperature" – "**SYSTEM INFO: Temp.**" submenu is activated.

System information – temperature

This menu shows the temperature inside the head-end station. Additionally the temperature display can be switched from degree Celsius to degree Fahrenheit and the highest inner temperatures recorded to date can be displayed.

- Using the + / - buttons set the temperature display wished.
- To activate the highest inner temperatures press the MULTI button.

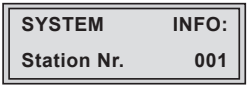
—> Press the MULTI button again to return to the previous menu.

- Press the ▶ button.

—> The "System information – number of the head-end station" – "**SYSTEM INFO: Station Nr.**" submenu is activated.

System information – number of the head-end station

This menu shows the number of the head-end station (see also item "Setting the consecutive number of the head-end station", page 32).

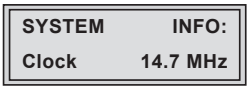


- Press the ► button.

—> The "System information – clock frequency" – "**SYSTEM INFO: Clock**" submenu is activated.

System information – clock frequency

This menu shows the clock frequency of the control unit. The frequency can be 14.7 or 16.0 MHz.



- Press the **MODE** button.

—> The "Setting the HF output level of the cassettes" – "**BOX LEVEL**" menu is activated.
—> Pressing the ► button you return to the "System information – control unit" – "**SYSTEM INFO: BE-Remote**" menu (page 29).

Setting the HF output level of the cassettes

This menu allows to select the cassettes one after the other and set their HF output levels.

- Select all cassettes one after the other using the ◄/► buttons, measure and note their HF output levels.
- Activate the cassettes with higher HF output levels using the ◄/► buttons

and equal their HF output levels to the value of the cassette with the lowest HF output level using the **+**/**-** buttons ("**0** … **-25 dB**")

- Press the **MODE** button.

—> The "Setting the HF output level of the head-end station" – "**STATION LEVEL:**" menu is activated.

Setting the HF output level of the head-end station

This menu allows to set the HF output level of the head-end station to the requirements of the cable system.

STATION LEVEL:
LEVEL -3 dB

- Set the HF output level of the head-end station using the **+**/**-** buttons ("**0 … -6 dB**").

- Press the **MODE** button.

—> The "Setting the consecutive number of the head-end station" – "**STATION NUMBER:**" menu is activated.

Setting the consecutive number of the head-end station

If several head-end stations are used in a cable system the head-end stations must get a consecutive number to identify them if the PSW 1000 software is used.

STATION NUMBER:
001

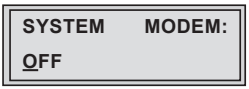
- Use the **+**/**-** buttons to set the consecutive number.

- Press the **MODE** button.

—> The "Activating the modem connection" – "**SYSTEM MODEM:**" menu is activated.

Activating the modem connection

If the head-end station is to be remote controlled using the PSW 1000 configuration software and a modem connected to the head-end station (without HRCU 8 / RCU 1) activate the modem mode in this menu ("**ON**").



- Using the **+**/**-** buttons switch on the modem mode "**ON**" or if necessary switch it "**OFF**".

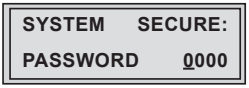
—> If no modem is found "**NOT FOUND**" is displayed.

- Press the **MODE** button.

—> The "Setting the password" –
"**SYSTEM SECURE:**" menu is activated.

Setting the password

In this menu the access to the software of the control unit and the cassettes can be refused.



- Use the **◄**/**►** buttons to place the cursor under the digits to be set for the password.
- Use the **+**/**-** buttons to set the digits of the password wished.

Saving settings

- Press the **M** button.

—> The settings are saved.
—> You return to the "Activating system information" menu item (page 29).
—> By pressing the **MODE** button, you will be returned to the menu item "System information – control unit" **without** saving the programmed data (page 29).

Programming the head-end station (following excess temperature)

If the maximum permissible temperature for the head-end station (inner temperature) is exceeded, "**ATTENTION**" appears in the display instead of the "**BE-Remote**" standby display.
In this operating state, the menus for the cassettes and operating unit are locked. To be able to access the menus for the cassettes and operating unit, the software needs to be unlocked.

⚠ **The cause of the excess temperature must be determined and the appropriate corrective measures taken for the head-end station to operate smoothly again (e.g. additional ventilation).**

In the "**ATTENTION**" menu, the number of the particular head-end station (e.g. "**Temp.1**") and the temperature (e.g. "**68 °C**") are displayed.

- Press the **MODE** button.

—> The "System information" – "**SYSTEM INFO:**" menu is activated.

System information

In this menu, the inner temperature is displayed which activated the lock (e.g. "**68 °C**") and the highest inner temperature recorded to date (e.g. "**84 °C**"). The inner temperature which activated the lock must be deleted to reactivate the temperature monitor and the software. You can also select the current inner temperature.

- Press the **MULTI** button to select the current inner temperature (e.g. "**21 °C**").

  —> Press the **MULTI** button again to return to the previous menu.

- Press and hold down the ◄ button for at least 3 seconds to delete the activation temperature (e.g. "**68 °C**").

  —> The current inner temperature appears.

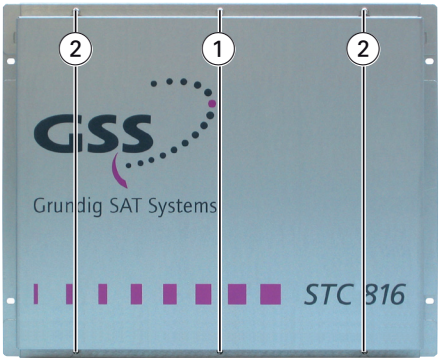
- Press the **M** button.

  —> The settings are saved.
  —> You return to the "Activating system information" menu item (page 29).

12 Final procedures

After installing the head-end station, upgrading accessories or installing cassettes it is necessary to tighten all cable connections, cable terminals and cover screws in order to maintain compliance with current EMC regulations securely.

- Securely tighten the cable connections (Cinch, HF connectors) using an appropriate open-ended spanner.
- Hang the front cover into the mounting screws (2).
- Tighten the mounting screws.
- Attach the locking screws (1) and tighten it



To avoid disturbances and problems in reception in the connected cable network, it is absolutely necessary to adjust the output level of the complete receiving installation to the necessary linear values (for example UKW, 64 QAM 8-16dB and 256 QAM 4-6dB below the analogous level)!

Service:

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Email: service@gss.de

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